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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,487	08/16/2001	Kwang-chul Kim	Q63013	9927

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EXAMINER	
JACOBSON, TONY M	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 08/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/930,487	KIM, KWANG-CHUL	
	Examiner	Art Unit	
	Tony M Jacobson	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☒ Claim(s) *12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 August 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the mean square calculator for calculating the mean square of the samples stored in the two window buffers (as claimed in claim 3) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The incorporation of essential material in the specification by reference to a foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference. The amendment must be accompanied by an affidavit or declaration executed by the applicant, or a practitioner representing the applicant, stating that the amendatory material consists of the same material incorporated by reference in the referencing application. See *In re Hawkins*, 486 F.2d 569, 179 USPQ 157 (CCPA 1973); *In re Hawkins*, 486 F.2d 579, 179 USPQ 163 (CCPA 1973); and *In re Hawkins*, 486 F.2d 577, 179 USPQ 167 (CCPA 1973).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 3, 7-9, 12, and 15-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

5. Regarding claims 1, 7, 8, and 15-18, claims 1, 7, 15, and 17 recite, "calculating the null symbol length of each sample", claims 1, 15, and 17 recite, "detecting the starting and end points of the null symbol of each sample", and claims 8, 16, and 18 recite, "to detect the starting and end points of the null symbol of each sample". Applicant has not disclosed how each sample possesses a null symbol, nor, therefore, how a length of a null symbol of each single sample would be calculated or how a starting or end point of a null sample of each single sample would be detected. According to Applicant's disclosure and the prior art, a null symbol comprises many samples; and a single sample, being the elemental division of a sampled signal, cannot contain a null symbol, a starting point of a null symbol, nor an end point of a null symbol that is distinguishable from any other part of the given sample. Applicant has not described the invention claimed in such a way as to enable one of ordinary skill in the art to make and use the invention. Since these limitations are not enabled by the disclosure, they are ignored in the prior art rejections below.

6. Claim 3 recites, "a mean square calculator for calculating the mean square of the samples stored in the two window buffers". Applicant has not disclosed an embodiment of the invention in which samples stored in two window buffers are squared, then the squares of the values in the buffers are summed, and the resulting sum is then divided by the number of samples squared and summed to create a mean square of the samples in the buffers, as required to form a mean square of the sample values stored in the buffers according to the definition of "mean square". Instead, the embodiment of

Fig. 5 merely forms a sum of the sample values stored in window buffer W_1, separately forms a sum of the sample values stored in window buffer W_2, and divides the sum of the sample values in buffer W_1 by the sum of the sample values stored in buffer W_2, which does not constitute a mean square calculation by any common definition known to the examiner. Although the invention as disclosed in the specification produces two scaled (times the number of samples in each buffer, due to the absence of a division by the number of samples) mean square calculations of respective sets of prior input samples via buffers W_1 and W_2 and the associated summers of Fig. 5, the disclosed embodiment does not produce the mean square of the samples stored in the buffers W_1 and W_2 (which are already the squares of prior input samples). Also, the term "the mean square of the samples stored in the two window buffers" at lines 6-7 of claim 3 indicates that a single mean square value is calculated, while Fig. 5 indicates that two separate scaled mean square values of prior samples are formed. Thus, the subject matter claimed is not described in such a way as to enable one of ordinary skill in the art to make and use the invention.

7. Similarly to claim 3, claim 9 recites, "calculating the means square values for a first search period by dividing the sum of the square of each sample stored in a first window buffer by the sum of the square of each sample stored in a second window buffer". Again, Applicant has not disclosed an embodiment in which values stored in first and second window buffers are squared, summed, and then divided by the number of samples, according to the common definition of "mean square". The subject matter

claimed is not described in the specification in such a way as to enable one of ordinary skill in the art to make and use the invention.

8. Claim 12 is rejected due to inheritance of the non-enabled limitations of claims 7-9 indicated above.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1 and 3-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. Claim 1 recites the limitation "the null symbol length of each sample" in line 3 and "the null symbol of each sample" in lines 4-5. There is insufficient antecedent basis for these limitations in the claim. No prior mention is made of a "null symbol", a "null symbol length", a "null symbol length of each sample", nor "a null symbol of each sample"; and one of ordinary skill in the art would not reasonably conclude that a received audio data transmission inherently possesses null symbols, much less that each sample thereof inherently possesses a null symbol or a null symbol length.

12. Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine

the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "mean square" in claims 3 and 9 is used by the claims to mean "ratio/quotient of sums" (as best understood), while the accepted meaning is "average of squares" or, equivalently, "sum of squares divided by the number of values considered". The term is indefinite because the specification does not clearly redefine the term.

13. Claim 4 recites the limitation "wherein the size of each window buffer is equal to the data symbol length for MODE 3 of the digital audio broadcasting scheme". There is insufficient antecedent basis for these limitations in the claim, and because there may exist a number of different digital audio broadcasting schemes and the modes of these schemes may be arbitrarily named or numbered while having mutually different data symbol lengths, one of ordinary skill in the art would not be apprised of the meaning and scope of this limitation; consequently, the claim is rendered indefinite. (Even if a particular digital broadcasting standard [e.g., BS.744] were recited in the claim, the evolving nature of standards may render the limitation indefinite.)

14. Regarding claims 5, 6, 10, and 14, similarly to claim 4, claim 5 recites the limitation "wherein the first search period is equal to the frame length for MODE 1 of the digital audio broadcasting scheme"; claim 6 recites the limitation "wherein the second search period is longer than the null symbol length for MODE 1 of the digital audio

broadcasting scheme"; claim 10 recites the limitation "wherein the first search period is equal to the frame length for MODE 1 of the digital audio broadcasting scheme, and the second search period is longer than the null symbol length for MODE 1"; and claim 14 recites the limitation "wherein the first boundary value is set to a value between the null symbol lengths for MODE 3 and MODE 2 of the digital audio broadcasting scheme, the second boundary value is set to a value between the null symbol lengths for MODE 2 and MODE 4, and the third boundary value is set to a value between the null symbol lengths for MODE 4 and MODE 1". For the same reasons given above regarding claim 4, these claims are indefinite.

15. Regarding claims 7, 8, and 15-18, claims 7, 15, and 17 recite the limitation "the null symbol length of each sample", and claims 7, 8, and 15-18 recite the limitation "the null symbol of each sample". There is insufficient antecedent basis for these limitations in the claims. The claims make no proper prior mention of a "null symbol", a "null symbol length", a "null symbol length of each sample", nor a "null symbol of each sample", and one of ordinary skill in the art would not reasonably conclude that a received audio data transmission inherently possesses null symbols, much less that each sample thereof inherently possesses a null symbol or a null symbol length.

16. Claim 11 recites the limitations "the condition of step (b1)" in lines 6 and 8, "the condition of step (b3)" in lines 9 and 13, and "the condition of step (b5)" in lines 15 and 17. There is insufficient antecedent basis for these limitations in the claim. The

claim makes no proper prior mention of "conditions" of steps (b1), (b3), or (b5).

17. Claim 12 is rejected due to the inheritance of the indefinite limitations from claims 7-9 and 11 indicated above.

18. Claim 13 recites the limitation "wherein the first, second and third boundary values are set so that the boundary values are in the order of increasing null symbol length for each mode". As worded, the meaning and scope of this statement is unclear. One of ordinary skill in the art would not readily recognize what is meant by "setting" the boundary values so that they are in the order of increasing null symbol length for each mode; i.e., what does "setting" the values entail, what if anything is the relationship of this "setting" to the names "first", "second", and "third", and does this mean that the process of "setting" each of the first, second, and third boundary values is repeated for each mode?

Claim Rejections - 35 USC § 102

19. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

20. Claims 1, 7, 15, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Taura et al. (US 6,516,039).

21. Regarding claims 1 and 15, Taura et al. discloses in Fig. 1 an apparatus for detecting a transmission mode in a digital audio receiver, comprising: a null symbol length calculation unit (synchronization signal [null symbol – see column 1, lines 45-56] detector 12 in combination with control unit 14) for calculating the null symbol length by detecting the starting and end points of the null symbol (column 3, lines 48-57); and a mode determination unit (comprised in control unit 14) for determining a transmission mode by comparing the null symbol length calculated by the null symbol length calculation unit with a predetermined range of the null symbol length for each mode (Fig. 6; column 4, lines 16-23).

22. Regarding claims 7 and 17, as described above regarding claim 1, the apparatus of Taura et al. performs the method of claims 7 and 17 in normal operation.

Claim Rejections - 35 USC § 103

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

24. Claims 2, 8, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taura et al. (US 6,516,039) in view of Thebault et al. (US 5,822,384) and Nomura (US 6,731,702).

25. Regarding claims 2, 8, 16, and 18, Taura et al. does not disclose details of synchronization signal (null signal) detector 12, except to state at column 3, lines 48-54 that it detects the envelope of the intermediate frequency signal; and, therefore, does not disclose that the apparatus comprises a square value calculating unit for calculating the square of the value of each sample of a received signal to detect the starting and end points of the null symbols. It was well known in the art at the time the present invention was made to employ square value calculating circuits/units as envelope detectors (i.e., "square-law detectors") in a wide variety of signal processing applications. For example, Thebault et al. discloses in Fig. 3 a prior-art system for acquiring synchronization between a transmitter and associated receiver, in which a

square value calculating unit (43) is employed as an envelope detector to calculate the square of the value of a received signal (column 2, lines 59-61). Although neither Taura et al. nor Thebault et al. discloses squaring a sampled (digital) signal (Taura et al. implies that synchronization signal detector 12 operates on an analog signal, while Thebault et al. remains silent as to digital vs. analog processing), at the time the present invention was made, it was well known in the art to perform signal processing operations such as null-symbol detection upon received signals in a digital receiver subsequently to analog-to-digital conversion. Nomura discloses in Fig. 1 a digital audio receiver having circuitry (AFC circuit 5 – see Fig. 2) for detecting the positions of null symbols, including a square value calculating unit (55 – see column 8, lines 9-13) that operates on a sampled digital signal. It would have been obvious to one of ordinary skill in the art at the time the present invention was made to implement the envelope detector in the null signal detector (12) of Taura et al. with a square value calculating unit according to common practice in the art as exemplified by the prior art disclosed by Thebault et al. and further to implement the null signal detector (including the square value calculating circuit) utilizing digital circuitry, disposed following the analog-to-digital converter (ADC 5), to operate on the samples of the digital signal generated thereby according to the teachings of Nomura. Further regarding claims 8 and 18, such an apparatus would perform the method of these claims in normal operation; thus the claimed methods are also rendered obvious.

Conclusion

26. Because the examiner anticipates substantial amendment will be required to overcome the 35 USC 112, first and second paragraph rejections of the claims, prior-art rejections have not been made against claims 3-6 and 9-14 in this Office action; however, following amendment in response hereto, prior-art rejections may be made against the amended claims.

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

28. Sano et al. (US 6,381,251), Uchiyama et al. (US 6,744,828), Rasky et al. (US 5,428,647), Tsuruoka (US 6,549,589), Lee (US 2003/0021363 A1), Bernhard et al. (US 5,436,935), and Katsumoto (EP 0944194 A2) disclose digital audio receivers having specific means for detecting null symbols or similar synchronization signals.

29. Wagner (US 4,507,795) discloses an apparatus and method for locating leading and trailing edges of RF pulses (the essential function of the null symbol detector of the present invention).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony M Jacobson whose telephone number is 703-305-5532. The examiner can normally be reached on M-F 11:00-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tmj
August 2, 2004

XU MEI
PRIMARY EXAMINER